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ANALYSIS OF CHEMICAL COMPOUNDS IN ESSENTIAL OILS EXTRACTED FROM CHINESE AND LITHUANIAN GARLIC USING HYDRODISTILLATION AND CHROMATOGRAPHY METHODS

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Aim. To evaluate the chemical compounds of essential oils extracted from Chinese and Lithuanian garlic using hydrodistillation and chromatography methods, and compare characteristics in between.

Methods. *Allium sativum* L (garlic) samples from Lithuania and China were used for hydrodistillation. Each 250g garlic portion was washed, peeled, chopped, and mixed with an equal amount of water. The distillation process lasted one hour, allowing steam to extract essential oils. After condensation, the oil was separated using a syringe due to its higher density than water. Each sample yielded 7.3 ml of essential oil. The oils were then analyzed using gas chromatography-mass spectrometry (GC-MS) with a Shimadzu system and a non-polar capillary column. For analysis, 10 µl of oil was diluted in 1 ml hexane/diethyl ether mixture (1:1), and 1 µl was injected into the GC-MS. Compounds were identified using retention times and spectral library matches (≥90%), with composition based on peak area.

Results. The profiles of garlic oils are dominated by sulfur compounds, such as disulfides, trisulfides, and other organosulfur molecules with known biological activity. In the Lithuanian garlic chromatogram, the main compounds are Diallyl trisulfide (23.67%) and Diallyl disulfide (20.94%). Methyl allyl trisulfide accounts for 9.91%, and Diallyl tetrasulfide and Allyl (E)-prop-1-enyl trisulfide make up 3.42% and 1.69%, respectively. In Chinese garlic, the dominant compounds are Diallyl disulfide (21.35%) and Diallyl trisulfide (21.79%), with a broader variety, including Methyl allyl trisulfide (10.96%), Dimethyl trisulfide (1.28%), and Allyl (E)-prop-1-enyl trisulfide (3.10%). The Lithuanian garlic has a higher concentration of disulfides, while the Chinese garlic displays a broader range of trisulfides, contributing to its diverse aromatic profile.

Conclusion. The Lithuanian garlic has a higher concentration of disulfides, while the Chinese garlic exhibits a broader spectrum of trisulfide diversity, leading to different aromatic properties.

Key words. Hydrodistillation, gas chromatography, garlic essential oil, sulfur compounds, Lithuanian garlic, Chinese garlic, chemical analysis.